

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band	)	WT Docket No. 07-195
	)	)
Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands	)	WT Docket No. 04-356
	)	)

**COMMENTS OF NOKIA INC. AND NOKIA SIEMENS NETWORKS**

Nokia Inc. (“Nokia”) and Nokia Siemens Networks US LLC (“NSN”) respectfully submit comments in the above-referenced proceeding on Service Rules for Advanced Wireless Services (“AWS”).

Nokia is the world leader in mobility, driving the transformation and growth of the converging Internet and communications industries. We make a wide range of mobile devices with services and software that enable people to experience music, navigation, video, television, imaging, games, business mobility and more. Developing and growing our offering of consumer Internet services, as well as our enterprise solutions and software, is a key area of focus. We also provide equipment, solutions and services for communications networks through Nokia Siemens Networks. As the world’s largest mobile phone manufacturer with over 437 million mobile device units sold in 2007, Nokia has extensive experience with handset design and, in particular, filter design.

Nokia Siemens Networks is a leading global enabler of communications services. The company provides a complete, well-balanced product portfolio of mobile and fixed network infrastructure solutions and addresses the growing demand for services with 20,000 service professionals

worldwide. Nokia Siemens Networks is one of the largest telecommunications infrastructure companies in the world with operations in 150 countries.

The Commission seeks comments on its proposal to permit downlink and uplink transmissions throughout the entire 2155-2180 MHz (“AWS-3”) band. The Commission also seeks comment on other service rules to be applied to the AWS-3 band, including whether it is appropriate to require AWS-3 mobiles to attenuate out-of-band emissions (OOBE) by  $60 + 10\log(P)$  dB outside of the AWS-3 band, and establish a power limit for AWS-3 mobile devices of 23 dBm/MHz equivalent isotropically radiated power (EIRP) as well as whether to require an OOBE limit of  $43 + 10\log(P)$  dB for AWS-3 base and fixed downlink stations and a power limit of 1640 watts peak EIRP in non-rural areas and 3280 watts peak EIRP in rural areas.

Nokia and NSN comment here on the proposed service rules for AWS-3. We do not comment on whether or not the AWS-3 band should include 2155-2175 MHz or also include the 2175-2180 MHz block. Our comments apply to either scenario.

The goal of ensuring broadband access for all Americans is a laudable goal. However, we believe that the best way to do this is through a highly competitive market where free market mechanisms help drive low-cost equipment and services. The importance of low-cost equipment for accessing broadband services cannot be discounted if the goal is to ensure that underserved Americans are able to get broadband access at the lowest possible total ownership cost.

We are concerned that the proposed rules would result in U.S.-only spectrum plans and equipment requirements that would drive up costs for both AWS-1 and AWS-3 devices and result in delays in deployment of Advanced Wireless Services (AWS). Globally harmonized spectrum has many benefits, including lower cost equipment due to economies of scale. Creating U.S.-specific product

requirements through unique spectrum uses will increase equipment costs and lead to time to market delays in the roll out of Advanced Wireless Services by AWS-1 carriers, including small and regional carriers.

We are concerned that the service rules as proposed for AWS-3 would result in harmful interference that would require significant technical limits or guard bands to ensure adequate protection for AWS-1 systems.

Even if AWS-1 equipment could be redesigned at reasonable cost and in a quicker time frame, allowing TDD operations in spectrum immediately adjacent to AWS-1 FDD systems would still require stringent technical limits or significant guard bands to protect AWS-1 operations from harmful interference, a steep cost for a less than ideal result.

Efficient use of spectrum resources should be a goal of spectrum management policy. The service rules as proposed would likely result in a need for guard bands, in essence “wasting” valuable spectrum resources. This does not further the goal of maximizing the use of spectrum or encouraging deployment of broadband services.

***Uplink and Downlink Transmissions Should Only Be Permitted in the AWS-3 Band With Stringent Technical Limits or Significant Guard Bands***

Nokia and NSN believe that the Commission should not permit uplink and downlink transmissions throughout the AWS-3 band without significantly more stringent technical limits and/or substantial guard bands. Having observed T-Mobile’s testing of AWS-3 into AWS-1 interference, we believe that allowing both uplink and downlink transmissions in the AWS-3 band as proposed will create significant interference for the mobiles operating in the adjacent 2110-2155 MHz (“AWS-1”)

downlink band, including blocking the reception of AWS-1 terminals in some cases. Spurious emissions from AWS-3 transmitters to the AWS-1 downlink band may present even more serious interference concerns for AWS-1 systems, depending on what the requirements are for the AWS-3 transmitter. This interference would not be “rare”, “easily avoided” or “limited in the unlikely event they occur” as claimed by one commenter in this proceeding.<sup>1</sup>

Given our analysis to date, if uplink and downlink transmission are permitted throughout the AWS-3 band, we believe that AWS-3 should be required to attenuate OOB with significantly more stringent limits. However, we believe that further testing and study is needed to determine if these OOB are appropriate or if more stringent requirements need to be imposed.

It should also be noted that even more stringent limits do not negate the need to have a guard band between AWS-1 and AWS-3 operations, where TDD operations are permitted in AWS-3 spectrum. With existing filter technologies, significant guard bands would still be required to realize any significant rejection of AWS-3 emissions into AWS-1 devices. This would result in a significant portion if not all of the AWS-3 bandwidth being used for guard bands. This would hold true for the most commonly used filter types, AWS-1 Surface Acoustic Wave (SAW) filters and Bulk Acoustic Filters (BAW).

We urge the FCC to consider the implications for efficient use of the spectrum in considering what uses are allowed in AWS-3 frequencies. Permitting uses such as TDD which lead to significant power constraints or imposition of guard bands could result in the inefficient use of valuable spectrum resources.

### ***Unique Filters and Lack of Global Harmonization Come at a Cost***

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<sup>1</sup> *Ex-Parte* of M2Z Networks, WT Docket Nos. 07-195, 04-356, 07-16 and 07-30 (June 17, 2008) at 7.

As the largest purchaser of mobile handset filters in the world, Nokia has extensive experience with and knowledge of filters that are available today or planned for the future. To our knowledge, there are no filters on the market today or planned for the near future that can significantly mitigate interference between adjacent FDD and TDD systems, such as the AWS-1 and AWS-3 operations, respectively. There are currently no filters on the market or in any major filter manufacturer's roadmaps that provide suppression beginning at 2155 MHz.

Creating such a filter would be technically challenging and it is unknown what the impacts will be on device design, including hardware, software and power consumption. Even if technically feasible, the proposed redesign would create substantial trade-offs in terms of time to market and significantly increased device costs for AWS-1 mobile devices.

M2Z Networks has advocated that AWS-1 filters currently on the market or planned be re-designed, accusing AWS-1 licensees of using "filters designed for foreign markets" to "save a few cents on some phones". The implication is that AWS-1 licensees can easily and inexpensively design U.S.-specific filters that would suppress interference beginning at 2155 MHz rather than 2170 MHz for little additional cost or trouble. This is simply not accurate.

Designing U.S.-specific filters would be unique and consequently more expensive as they would not benefit from global economies of scale. Use of the 2110-2170 MHz frequency band paired with 1710-1770 MHz for IMT has been allocated by Organization of American States (OAS)'s Inter-American Commission on Telecommunications (CITEL) for the Americas region and adopted by governments in the region. The 2110-2170 MHz band has also been allocated as downlink-only for IMT globally by the International Telecommunications Union (ITU), providing additional economies of scale. Creating a U.S.-only band plan requiring U.S.-only filters would result in equipment that does not

take advantage of these global and regional economies of scale and consequently would be more expensive. The costs of development and production, particularly R&D costs to create hardware specific to a single market or region, would make these mobiles more expensive. These are costs that will be passed onto U.S consumers.

To redesign AWS-1 filters and mobiles at this late date would lead to an expected additional two years of delay in deployment of AWS-1 terminals and at significant increased expense. To roadmap, develop and begin production of filters at more reasonable costs would take a significantly greater amount of time before these terminals could reach the market. This would undermine the mobile industry's considerable investments in equipment roadmaps and business plans for this band based on the Commission's prior usage determinations. More importantly, it would delay the roll-out of Advanced Wireless Services.

### ***Filters are Not a Panacea***

The trade-offs noted above are particularly unattractive as even re-engineered filters with a frequency cut-off of 2155 MHz will not entirely mitigate interference from AWS-3 transmissions. The implication of some comments in this proceeding is that a filter re-design would significantly reduce the possibility or severity of interference between AWS-1 and AWS-3 systems.

Redesign of AWS-1 filters cannot be viewed as a panacea for interference between FDD and TDD systems. Even redesigned filters using technologies such as split-band duplexers designed for the U.S. market - assuming they could be manufactured at reasonable cost and with all design issues resolved - would not eliminate the need for a guard band to ensure reasonable performance for AWS-1 and AWS-3 systems. This seems to be too large of a cost for relatively little gain.

### *Summary*

Nokia and NSN urge the Commission to carefully consider what uses are allowed in the AWS-band. The proposed service rules would result in significant interference to incumbent AWS-1 systems and have a negative impact on the planned deployment of Advanced Wireless Services in the AWS-1 band. Redesign of currently planned AWS-1 equipment for a U.S.-only band plan would be complex, costly and likely lead to a delay in AWS-1 services. These impacts as well as the importance of global spectrum harmonization – and its benefits in terms of lower costs – should be taken into consideration. Finally, re-design of equipment and more specifically filters for mobile phones should not be considered a solution to the issue of harmful interference. Even a re-design of mobile filters would not eliminate the need for more stringent technical limits or a significant guard band between adjacent TDD and FDD systems. We respectfully urge the Commission to consider the efficient use of spectrum, and the importance of low costs for broadband equipment for consumers, and how best to enable broadband services in both the AWS-1 and AWS-3 bands.

Respectfully Submitted,

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